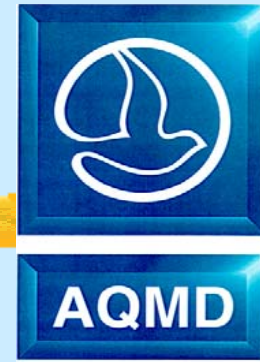


THREE LOCOMOTIVE DEMONSTRATION PROJECTS



**Mike Bogdanoff
South Coast Air Quality
Management District**

THREE PROJECTS



- **Demo DPF + SCR on Caterpillar 3406 Head End Power (HEP)**
- **Demo DPF on MotivePower Switch Locomotive**
- **Demo SCR on EMD Passenger Locomotive**

DPF: Diesel Particulate Filter (PM)

SCR: Selective Catalyst Reduction (NOx, PM)

DPF+SCR ON HEAD END POWER

- Passenger locomotives have gen-sets called Head End Power (HEP) which provide passenger hotel power (~500 HP)
- HEP account for about 20% emissions due to continuous full power operation
- Demo Hug Engineering combination DPF (burner) + SCR System (urea) at Metrolink
- Expect 90% reductions in NOx and PM
- Contractor: MIRATECH Corporation

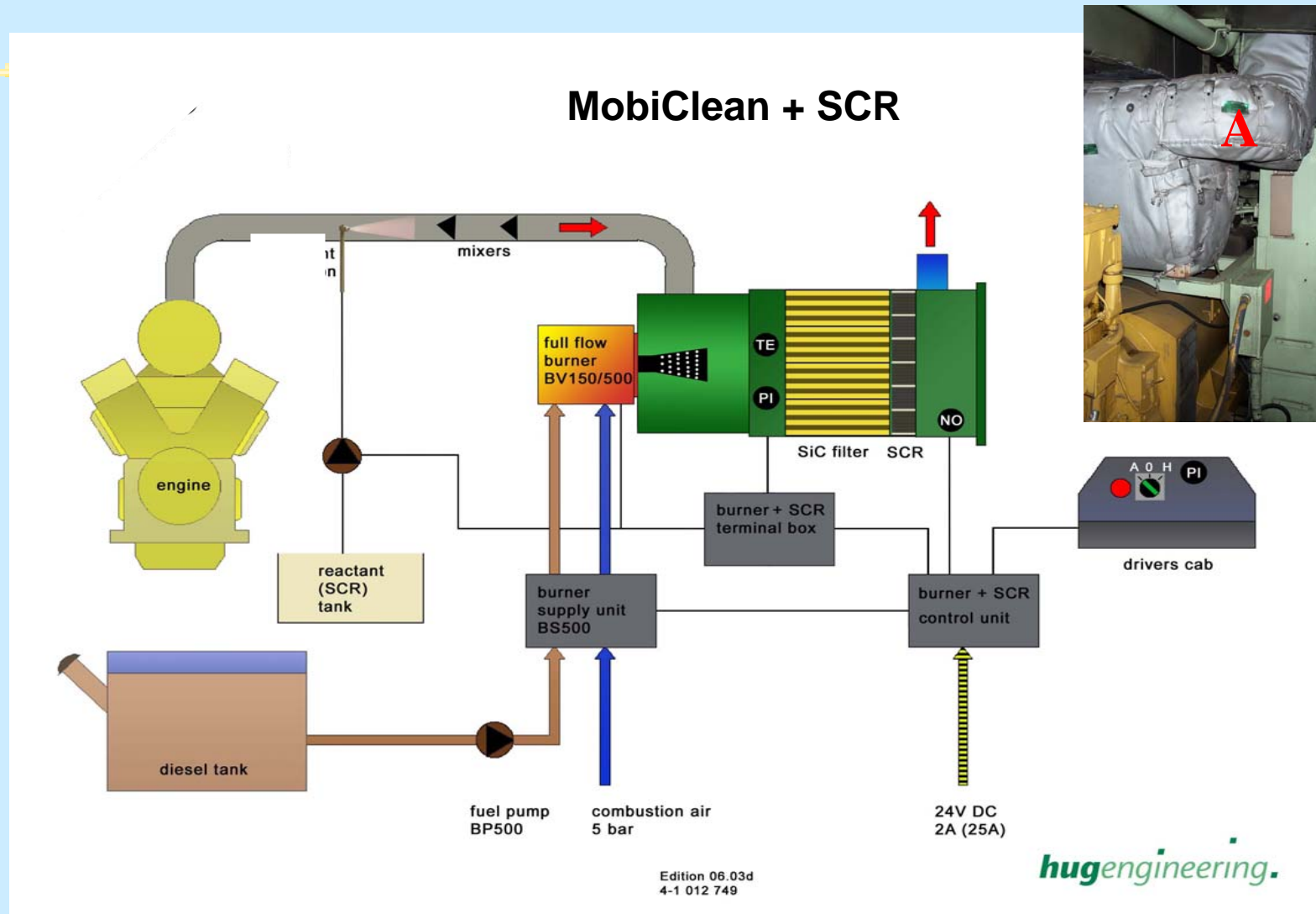
DPF+SCR ON HEAD END POWER



EMD F59PHI Locomotive
CAT 3406 HEP



DPF+SCR ON HEAD END POWER



DPF+SCR ON HEAD END POWER

Status

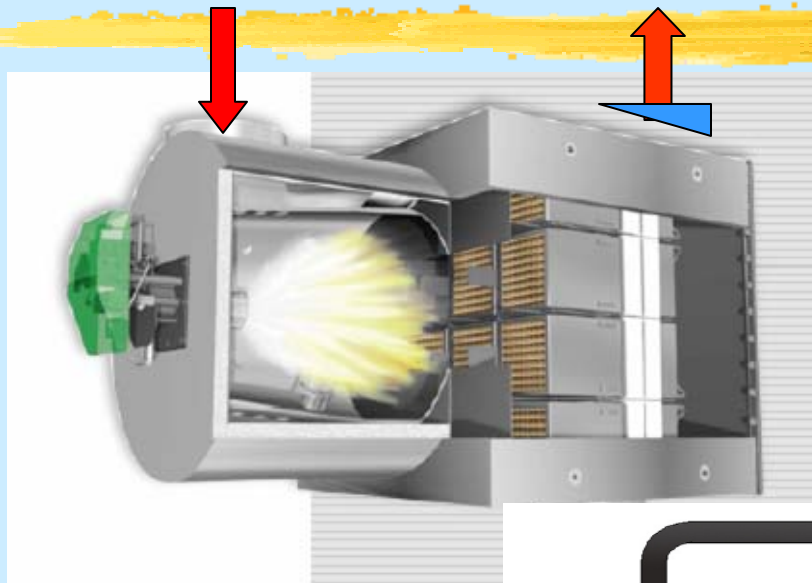
- Design is finalized & approved by HUG Engineering in Switzerland
- Design review meeting at Metrolink on November 29, 2007
- Fabrication & delivery from HUG expected in February 2008
- Installation late February 2008
- Demo expected March to February 2009

DPF ON SWITCH LOCOMOTIVE

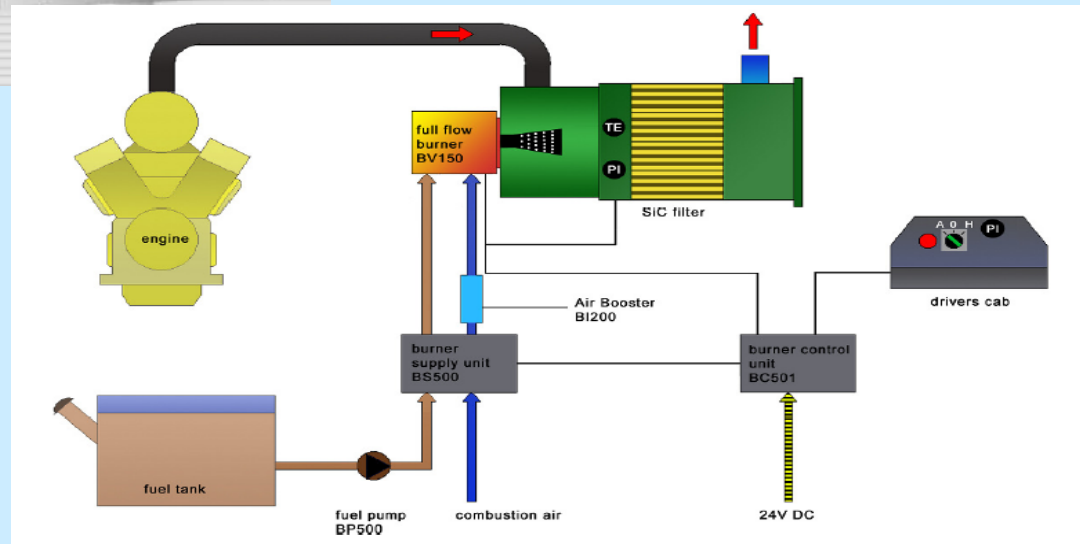
- **Pacific Harbor Line (PHL) is repowering 16 switch locomotives**
- **PHL-contractor MotivePower is replacing EMD 2-cycle engines with 4-cycle DDC/MTU 12V4000 engines (2000+ HP)**
- **Demo one Hug MobClean DPF system**
- **Expect 90%+ PM reduction**
- **Contractor: MIRATECH Corp.
Subcontractor: MotivePower**



DPF ON SWITCH LOCOMOTIVE



**Hug MobiClean DPF
and diesel-fueled burner
to fit inside carbody**



DPF ON SWITCH LOCOMOTIVE

Status

- Subcontract with MotivePower in negotiations – expected by Dec 2007
- Preliminary design completed by MIRATECH
- Project about 5 months behind schedule
- Installation projected for March 2008 & 1 year demo

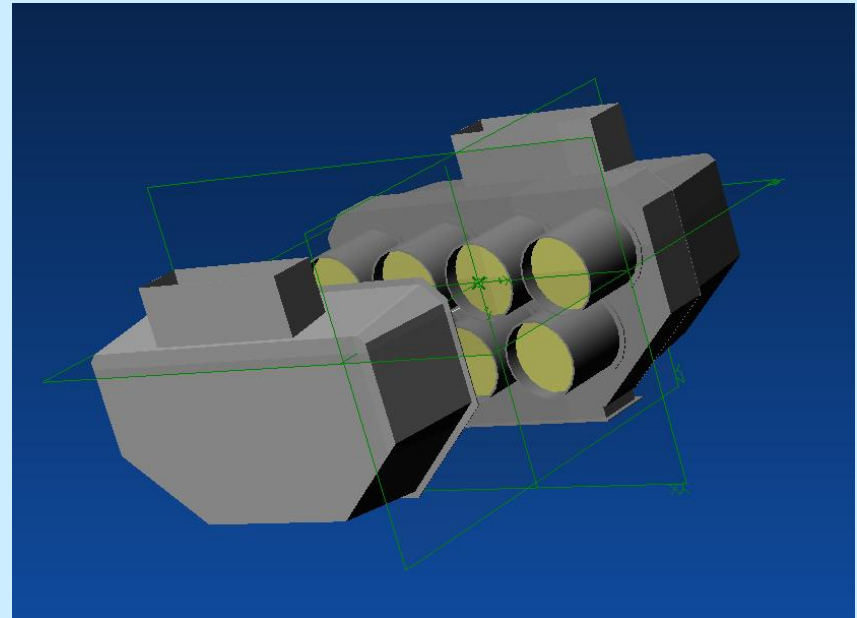


SCR ON EMD PASSENGER LOCOMOTIVE - METROLINK



- **EMD F59PH locomotives use 12-cyl engines similar to 16-cyl freight engines**
- **High cell-density European SCR catalyst developed for mobile use**
- **“Hardened” urea injection control system qualified for heavy-duty trucks & off-road equipment**
- **Contractor: Engine, Fuel & Emissions Engineering, Inc.**

SCR ON EMD PASSENGER LOCOMOTIVE - METROLINK



**Catalyst will fit inside existing carbody,
replacing silencer**

SCR ON EMD PASSENGER LOCOMOTIVE - METROLINK



SCR ON EMD PASSENGER LOCOMOTIVE - METROLINK

Status

- SCR unit fabricated & being emission tested at SwRI – sponsored by CARB
- After calibration & testing, unit to be shipped to Metrolink for installation with urea tank in March 2008
- Demo from April 2008 to March 2009



PROJECT SPONSORS



**FHWA/Caltrans
Metrolink
South Coast AQMD
Engine, Fuels & Emissions Engrg.
US EPA
MIRATECH Corporation
Pacific Harbor Lines
California Air Resources Board
MotivePower (WABTEC)**

SCAQMD

Technology Advancement



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